

ABSTRACT OF THE DISCLOSURE

An improved decoding technique useful for hard decision decoding, such as quadrature phase shift keying (PSK) and quadrature amplitude modulation (QAM), as well as soft-decision techniques, such as Viterbi decoding and trellis decoding. The system in accordance with the present invention provides adaptive decision regions for hard-decision decoding techniques and adaptive metrics for soft-decision detection techniques in which the decision boundaries and reference constellations, respectively are optimized in order to minimize the bit error rate (BER). In particular, the decision boundaries and metrics are optimized based on the locations of the received constellation points. By adaptively adjusting the decision boundaries and metrics, the BER can be greatly improved with the need for nonlinear predistortion at the transmitter thus reducing the hardware complexity and weight of the transmitter which provides additional benefits in applications, such as satellite communication systems, where the transmitter is located on the satellite.

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